

Patent Claims

1. A crystal-growing furnace, in particular a vertical Bridgman or vertical gradient freeze crystal-growing furnace having a jacket heater (11, 12) surrounding the crucible (6) coaxially and having a device for regulating the heat output of the jacket heater (11, 12), **characterized in that** a hollow cylindrical body (2) made of a heat conducting material is present as a heat bridge between the crucible (6) and the jacket heater (11, 12); at least two thermocouples (32, 35; 33, 34) which are offset radially relative to one another are provided in a horizontal plane intersecting the jacket heater (11, 12) and the crucible (6) for measuring a radial temperature difference, the heat output of the jacket heater (11, 12) being regulated as a function of the temperature difference.
2. The crystal-growing furnace according to Claim 1, **characterized in that** at least two jacket heaters (11, 12) are provided and are arranged such that they are spaced a distance apart in the axial direction, the heat output of each being adjustable independently of the other, and a pair of thermocouples (32, 35; 33, 34) being provided for each jacket heater (11, 12).
3. The crystal-growing furnace according to Claim 1 or 2, **characterized in that** the hollow cylindrical body (2) has at least two boreholes in which two thermocouples (32, 35; 33, 34) are provided, radially offset relative to one another, permitting measurement of a radial temperature difference in the hollow cylindrical body, and an electric variable representing this radial temperature difference in the hollow cylindrical body (2) is sent to a regulating device for the heat output of the jacket heater (11, 12).
4. The crystal-growing furnace according to Claim 3, **characterized in that** the borehole for the thermocouple (32, 33) situated on the outside radially is positioned in the radial direction, and the borehole for the thermocouple (34, 35), which is situated on the inside radially, is positioned in the axial direction.

5. The crystal-growing furnace according to Claim 3, **characterized in that** the thermocouples (32, 35; 33, 34) of a pair of thermocouples are connected electrically back to back, so that the differential voltage forms a measure of the temperature difference.
6. A method of regulating the heat output of a jacket heater (11, 12) which surrounds the cylindrical core zone of a crystal-growing furnace having a crucible (6), in particular a vertical Bridgman or vertical gradient freeze crystal-growing furnace, **characterized in that** the temperature of the jacket heater (11, 12) is regulated at the temperature in a selected point on the central axis of the crucible (6).
7. The method of regulating the heat output of a jacket heater (11, 12), **characterized in that** the temperature difference between two radially offset points within the jacket heater (11, 12) in a horizontal plane intersecting the jacket heater (11, 12) and the crucible (6) is determined, and the temperature difference thus determined is adjusted to zero by a corresponding regulation of the heat output of the jacket heater (11, 12).
8. The method of regulating the heat output of a jacket heater (11, 12) according to Claim 7, **characterized in that** the crystal-growing furnace is provided with a plurality of heating zones situated one above the other, each defined by a jacket heater (11, 12), and the regulation of the heat output of the jacket heaters (11, 12) of the individual heating zones is performed by a multi-variable regulator so that the sum of the squares of the deviation of the temperature differences prevailing in the particular heating zone is minimal.
9. The method of regulating the heat output of a jacket heater (11, 12) according to one of Claims 6 through 8, **characterized in that** the temperature measurement is performed with thermocouples (32, 35; 33, 34).